
Joshua A. Auld

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OBJECTIVE

To obtain a tenure-track faculty position in transportation planning.

EDUCATION

- Ph.D. University of Illinois at Chicago** (August 2011) GPA: 4.0/4.0
Department of Civil and Materials Engineering
Major: Transportation Engineering
Thesis: "Agent-based Dynamic Activity Planning and Travel Scheduling Model: Data Collection and Model Development"
Advisor: Prof. Abolfazl (Kouros) Mohammadian
- M.S. University of Illinois at Chicago** (January 2007) GPA: 4.0/4.0
Department of Civil and Materials Engineering
Major: Transportation Engineering
Thesis: "Analysis of National County-Level Heavy-Duty Freight Truck Emissions."
Advisor: Prof. Jane Lin
- B.S. University of Illinois at Urbana-Champaign** (December 2002) GPA: 3.5/4.0
Department of Civil and Environmental Engineering
Major: Structural Engineering, *Minor:* Construction Materials

RESEARCH AND TEACHING INTERESTS

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|----------------------------|---------------------------------------|
| • Travel Demand Analysis | • Intelligent Transportation Systems |
| • Activity-Based Modeling | • Data Simulation and Transferability |
| • Discrete Choice Modeling | • Microsimulation |
| • Travel Survey Methods | • Emergency and Evacuation Modeling |
| • Travel Demand Management | • Freight Modeling |

RESEARCH EXPERIENCE

- Computational Transportation Scientist, Argonne National Laboratory** (12/14-Present)
Project: "Coordinated Transit Response Planning and Operations Support Tools for Mitigating Impacts of All-Hazard Emergency Events"
Funding Agency: Federal Transit Administration
- Updating agent-based travel simulation with real-time data feeds
 - Emergency response survey and behavioral model development
 - Application of POLARIS model to emergency response forecasts
- Project:* "Illinois Long Distance Travel Model"
Funding Agency: Illinois Department of Transportation
- Primary model developer
 - Applied POLARIS simulation framework to model statewide long-distance travel by all modes
 - Designed household survey and supervised data collection and analysis efforts
 - Developed tool for analyzing statewide transportation policies for planning and forecasting

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Postdoctoral Researcher, Argonne National Laboratory/University of Illinois Chicago (1/12-12/14)

Project: "Planning and Operations Language for Agent-based Regional Integrated Simulations"

Funding Agency: Federal Highway Administration

- Primary travel demand modeler
- Applied new simulation framework to regional travel demand models
- Integrated modeling of travel demand, network assignment and network operations

Project: "IDOT220 High-Speed Rail Preliminary Feasibility Study"

Funding Agency: Illinois Department of Transportation

- Primary long-distance travel demand model developer
- Developed long-distance travel demand simulation model framework
- Estimated and calibrated travel demand model components
- Designed and implemented mode choice and personal travel surveys

Transportation Engineer, Argonne National Laboratory

(1/11-1/12)

Project: "Regional Transportation Simulation Tool for Evacuation Planning"

Funding Agency: Department of Homeland Security

- Designed and implemented online evacuation behavior survey
- Developed evacuation behavior models under no-notice emergency scenarios
- Extended TRANSIMS model components to account for evacuation behavior
- Designed user interface for TRANSIMS evacuation model workflow

Graduate Research Assistant/Fellow, University of Illinois at Chicago

(05/07 – 08/11)

Project: "ADAPTS: Agent-based Dynamic Activity Planning and Travel Scheduling, Model Development and Data Collection"

Funding Agency: National Science Foundation (NSF)

- Developed new, dynamic activity-based travel demand model
- Estimated core behavioral planning and scheduling process models
- Applied activity-based travel demand microsimulation for Chicago region
- Developed internet-based prompted recall activity-travel survey using GPS data

Project: "Population Synthesis in Support of Regional Travel Demand Modeling, Phase I", "Population Synthesis in Support of Regional Travel Demand Modeling, Phase II"

Funding Agency: Chicago Metropolitan Agency for Planning (CMAP)

- Developed population synthesis software for use in travel demand model
- Created regional forecasting and scenario evaluation additions to program
- Developed new multi-level synthesis methodology

TEACHING EXPERIENCE

Graduate Teaching Assistant, University of Illinois at Chicago

- CME 402: Geometric Design of Highway Facilities (01/07 – 05/07)
- CME 408: Traffic Engineering and Design (08/10 – 08/11)

Guest Lecturer, University of Illinois at Chicago

(01/09 – 11/12)

- CME 503: Advanced Transportation Demand Analysis
- CME 508: Urban Travel Forecasting
- CME 408: Traffic Engineering and Design

Graduate and Undergraduate Student Supervisor

(05/07 – 08/11)

- Supervised a graduate student in the completion of Master's Thesis
- Supervised undergraduate students conducting GPS household travel survey
- Supervised undergraduate students in ramp meter data collection project

JOURNAL PUBLICATIONS

- Auld, J.A., A. Mohammadian, M.S. Oliveira, J. Wolf and W. Bachman (2015). Demographic Characterization of Anonymous Trace Travel Data. Paper Transportation Research Record: Journal of the Transportation Research Board (in press).
- T.H. Rashidi, J. Auld, and A. Mohammadian (2013). Effectiveness of Bayesian Updating Attributes in Data Transferability Applications, in Transportation Research Record: Journal of the Transportation Research Board, No. 2344, pp 1-9.
- Sokolov, V., J.A. Auld and M. Hope (2012). A flexible framework for developing integrated models of transportation systems using an agent-based approach. *Procedia Computer Science*, 10, 854-859.
- Auld, J.A., V. Sokolov, A. Fontes and R. Bautista (2012). Internet-Based Stated Response Survey for No-Notice Emergency Evacuations. *Transportation Letters, International Journal of Transportation Research*, 4 (1), 41-53.
- Auld, J.A. and A. Mohammadian (2012). Activity Planning Processes in the Agent-based Dynamic Activity Planning and Travel Scheduling (ADAPTS) Model, in Transportation Research Part A: Policy and Practice, 46 (8), 1386 - 1403.
- Rashidi, T.H., J. Auld, and A. Mohammadian (2012). A behavioral housing search model: Two-stage hazard-based and multinomial logit approach to choice-set formation and location selection, in Transportation Research Part A: Policy and Practice, volume 46, issue 7, pp. 1097 - 1107.
- Auld, J., T.H. Rashidi, M. Javanmardi, and A. Mohammadian (2011). Dynamic Activity Generation Model Using a Competing Hazard Formulation, in Transportation Research Record: Journal of the Transportation Research Board, No. 2254, pp 28-35.
- Frignani, M., J. Auld, and A. Mohammadian (2011). Empirical Analysis of the Decision-Making and Tour Formation Process: Comparison between Seniors and Younger Individuals", in Transportation Research Record: Journal of the Transportation Research Board, No. 2231, 2011, pp. 27-34.
- Auld, J., and A. Mohammadian (2011). Planning-Constrained Destination Choice in Activity-Based Model: Agent-based Dynamic Activity Planning and Travel Scheduling". Transportation Research Record: Journal of the Transportation Research Board, No. 2254, 2011, pp. 170-179.
- Auld, J., A. Mohammadian, and P. Nelson (2011). Empirical Analysis of the Activity Planning Process", in Transportation Research Record: Journal of the Transportation Research Board, No. 2231, 2011, pp. 76-84.
- Auld, J.A. and A. Mohammadian (2010). An Efficient Methodology for Generating Synthetic Populations with Multiple Control Levels. *Transportation Research Record: Journal of the Transportation Research Board*, 2175, 138-147.
- Frignani, M., J.A. Auld, A. Mohammadian, C. Williams and P. Nelson (2010). Urban Travel Route and Activity Choice Survey (UTRACS): An Internet-Based Prompted Recall Activity Travel Survey using GPS Data. *Transportation Research Record: Journal of the Transportation Research Board*, 2183, 19-28.
- Auld, J.A., A. Mohammadian and M.J. Roorda (2009). Implementation of a Scheduling Conflict Resolution Model in an Activity Scheduling System. *Transportation Research Record: Journal of the Transportation Research Board*. 2135, 96-105.
- Auld, J.A. and A. Mohammadian (2009). Framework for the Development of the Agent-based Dynamic Activity Planning and Travel Scheduling (ADAPTS) Model. *Transportation Letters, International Journal of Transportation Research*, 1 (3), 245-255.
- Auld, J.A., A. Mohammadian and K. Wies (2009). Population Synthesis with Region-Level Control Variable Aggregation. *Journal of Transportation Engineering*, 135 (9), 632-639.
- Auld, J.A., A. Mohammadian and S.T. Doherty (2009). Modeling Activity Conflict Resolution Strategies Using Scheduling Process Data. *Transportation Research Part A: Policy and Practice*, 43 (4), 386-400.

- Auld, J. A., C. Williams, A. Mohammadian and P. Nelson (2009). An Automated GPS-Based Prompted Recall Survey with Learning Algorithms. *Transportation Letters, International Journal of Transportation Research*, 1 (1), 59-79.
- Auld, J.A., A. Mohammadian and S.T. Doherty (2008). Analysis of Activity Conflict Resolution Strategies. *Transportation Research Record: Journal of the Transportation Research Board*. 2054, 10-19.

BOOK CHAPTERS

- Auld, J.A. and A. Mohammadian (2014). Collecting Activity-Travel Planning Data Using GPS-Based Prompted Recall Surveys: Recent Experience and Future Directions, *Mobile Technologies for Activity-Travel Data Collection and Analysis*, H.J.P. Timmermans and S. Rasouli (editors), IGI Publishing.
- Auld, J.A, M. Hope and A. Mohammadian (2013). Simulation Frameworks for Integrated Modeling, in *Travel Behaviour Research: Current Foundations, Future Prospect*, M. Roorda and E. Miller (ed), Lulu Publishers, USA.
- Auld, J.A, and A. Mohammadian (2013). Development and Implementation of the ADAPTS Integrated Activity-Travel Model, in *Travel Behaviour Research: Current Foundations, Future Prospect*, M. Roorda and E. Miller (ed), Lulu Publishers, USA.
- Mohammadian, A., J. Auld, and S. Yagi (2009). Recent Progress on Activity-Based Microsimulation Models of Travel Demand and Future Prospects, Chapter 7, *Transportation Statistics*, Brian W. Sloboda (editor), J. Ross Publishing.

EDITORIALS

- Auld, J.A. (2013). Advances in Agent-based Microsimulation in Travel Demand Modeling. *Transportation Letters: the International Journal of Transportation Research*, 5(4), 165-166.
- Auld, J.A. and L. Zhang (2013). Inter-personal interactions and constraints in travel behavior within households and social networks. *Transportation*, 40 (4), 751-754.

CONFERENCE PROCEEDINGS (PEER-REVIEWED)

- Auld, J.A., M. Hope, H. Ley, V. Sokolov, B. Xu, K. Zhang (2014). POLARIS: A fully integrated agent-based simulation model of activity travel behavior and network operations. Paper presented at the 5th Conference on Innovations in Travel Modeling, April 27-30, 2014, Baltimore, Maryland.
- Sokolov, V., J.A. Auld, M. Hope, H. Ley, B. Xu (2013). Modeling framework for regional integrated simulation of transportation network and activity-based demand (POLARIS). Presented at International Symposium for Next Generation Infrastructure, October 1-4, 2013, Wollongong, Australia.
- Auld, J.A., M. Hope, H. Ley, V. Sokolov, B. Xu, K. Zhang (2013). POLARIS: Planning- and Operations-modeling Language for Agent-based Regional Integrated Simulations. Paper presented at the Conference on Agent-Based Modeling in Transportation Planning and Operations, September 30 - October 2, 2014, Blacksburg, Virginia.
- Auld, J.A. and A. Mohammadian (2012). Development and Implementation of the ADAPTS integrated activity-travel model. Paper presented at the 13th International Conference on Travel Behaviour Research, July 2012, Toronto.
- Auld, J.A., M. Javanmardi and A. Mohammadian (2012). Integration of Activity Scheduling and Traffic Assignment in ADAPTS Activity-Based Model. Proceedings of the 91st Annual Meeting of the Transportation Research Board, Washington, D.C.
- Rashidi, T.H., J.A. Auld and A. Mohammadian (2012). Effectiveness of Bayesian Updating Attributes in Data Transferability Applications. Proceedings of the 91st Annual Meeting of the Transportation Research Board, Washington, D.C.

- Auld, J.A. and A. Mohammadian (2010). Planning Constrained Destination Choice in the ADAPTS Activity-Based Model. Proceedings of the 12th World Conference on Transport Research, Lisbon, July 11-15, 2010.
- Auld, J.A., M. Frignani, A. Mohammadian and C. Williams (2010). Results of the UTRACS Internet-Based Prompted Recall GPS Travel Survey: Empirical Analysis of the Activity Planning Process. Proceedings of the 12th World Conference on Transport Research, Lisbon, July 11-15, 2010.
- Auld, J.A., A. Mohammadian and K. Wies (2010). An Efficient Methodology for Generating Synthetic Populations with Multiple Control Levels. Proceedings of the 89th Annual Meeting of the Transportation Research Board (DVD), Washington, D.C., Jan. 11-15, 2010.
- Auld, J.A., T.H. Rashidi and A. Mohammadian (2010). Evaluating Transportation Impacts of Forecast Demographic Scenarios Using Population Synthesis and Data Transferability. Proceedings of the 89th Annual Meeting of the Transportation Research Board (DVD), Washington, D.C., January 11-15, 2010.
- Auld, J.A., A. Mohammadian, P. Nelson (2009). Activity Planning Processes in the ADAPTS Activity-Based Modeling Framework. Proceedings of the 12th International Conference on Travel Behavior Research, Jaipur, India, December 13-18, 2009.
- Auld, J.A., T.H. Rashidi and J. Lin (2009). Analysis of National County-Level Heavy Duty Freight Truck Emissions. Proceedings of the Transportation, Planning, Land Use and Air Quality Conference 2009, Denver, CO, July 28-29, 2009. ASCE Proceedings 371, 1
- Auld, J.A., A. Mohammadian, T. Rashidi and K. Wies (2009). Evaluating Transportation Impacts of Forecast Demographic Scenarios Using Population Synthesis and Data Transferability. Proceedings of the 12th TRB National Transportation Planning Applications Conference, Houston, May 18-22, 2009.
- Auld, J.A., A. Mohammadian and M.J. Roorda (2009). Implementation of a Scheduling Conflict Resolution Model in an Activity Scheduling System. Proceedings of the 88th Annual Meeting of the Transportation Research Board (DVD), Washington, D.C., Jan. 11-15, 2009.
- Auld, J.A., A. Mohammadian and M.J. Roorda (2009). ADAPTS: Agent-based Dynamic Activity Planning and Travel Scheduling Model – A Framework. Proceedings of the 88th Annual Meeting of the Transportation Research Board (DVD), Washington, D.C., January 11-15, 2009.
- Auld, J.A., A. Mohammadian and S.T. Doherty (2008). Modeling Activity Scheduling Conflict Resolution Strategies. Proceedings of the 10th International Conference on Application of Advanced Technologies in Transportation, Athens, Greece, May 27-31, 2008.
- Auld, J.A., A. Mohammadian and K. Wies (2008). Population Synthesis with Control Category Optimization. Proceedings of the 10th International Conference on Application of Advanced Technologies in Transportation, Athens, Greece, May 27-31, 2008.
- Auld, J.A., A. Mohammadian and S.T. Doherty (2008). Analysis of Activity Conflict Resolution Strategies. Proceedings of the 87th Annual Meeting of the Transportation Research Board, Washington, D.C., January 13-17, 2008.
- Auld, J.A., A. Mohammadian and K. Wies (2008). Population Synthesis with Region-Level Control Variable Aggregation. Proceedings of the 87th Annual Meeting of the Transportation Research Board, Washington, D.C., Jan. 13-17, 2008.

TECHNICAL REPORTS AND THESES

- Wolf, J. W. Bachman, M.S. Oliveira, J. Auld, A. Mohammadian and P. Vovsha (2014). *Applying GPS Data to Understand Travel Behavior, Volume I: Background, Methods, and Tests*. NCHRP Report no. 775, Transportation Research Board.
- Wolf, J. W. Bachman, M.S. Oliveira, J. Auld, A. Mohammadian and P. Vovsha (2014). *Applying GPS Data to Understand Travel Behavior, Volume I: Guidelines*. NCHRP Report no. 775, Transportation Research Board.

- Kawamura, K., A. Mohammadian, P. Metaxatos, J. Auld and B. Karimi (2012). Ridership Estimation Study for the IDOT220 High-Speed Rail Preliminary Feasibility Study, prepared for Illinois Department of Transportation.
- Ley, H., V. Sokolov, M. Hope, J. Auld, K. Zhang, X. Kang (2011). RTSTEP regional transportation simulation tool for emergency planning - final report. Prepared for City of Chicago, Office of Emergency Management and Communications.
- Auld, J.A. (2011). *Agent-based Dynamic Activity Planning and Travel Scheduling (ADAPTS), Model Development and Data Collection*, Ph.D. Thesis. University of Illinois at Chicago, August, 2011.
- Mohammadian, A., M. Frignani, J.A. Auld (2011). *Senior Travelers' Trip Chaining Behavior: Survey Results and Data Analysis*. Technical Report FHWA-ICT-11-086, prepared for Illinois Center for Transportation.
- Auld, J.A. and A. Mohammadian (2009). *Population Synthesis – Phase II: Joint Household- and Person-Level Control Methodology*. Technical Report prepared for Chicago Metropolitan Agency for Planning. University of Illinois at Chicago.
- Auld, J.A. and A. Mohammadian (2009). *Population Synthesis – Phase II: Forecasting and Scenario Methodology and Evaluation*. Technical Report prepared for Chicago Metropolitan Agency for Planning. University of Illinois at Chicago.
- Auld, J.A. and A. Mohammadian (2008). *PopSYN-WIN Version 4.1: Methodology and Program Documentation*. Technical Report prepared for Chicago Metropolitan Agency for Planning. University of Illinois at Chicago.
- Auld, J.A. and A. Mohammadian (2007). *Population Synthesis: Input and Output Dataset Development*. Technical Report prepared for Chicago Metropolitan Agency for Planning. University of Illinois at Chicago.
- Auld, J.A. (2007). *Analysis of National County-Level Heavy-Duty Freight Truck Emissions*. Master's Thesis. University of Illinois at Chicago, December, 2007.

PRESENTATIONS

- Auld, J.A., H. Ley, M. Hope, V. Sokolov, K. Zhang and B. Xu (2012). POLARIS - Motivations and Basics. Presentation to the CTS IGERT Seminar, University of Illinois at Chicago, November 28, 2012.
- V. Sokolov, J. Auld, M. Hope, K. Zhang and H. Ley (2012). Planning and Operations Language for Agent-based Regional Integrated Simulations. Presentation at Innovations in Travel Modeling Conference, Workshop on Agent-Based Modeling, April 29, 2012.
- Auld, J.A. (2009). ADAPTS: Agent-based Dynamic Activity Planning and Travel Scheduling, Update on Model Development and Data Collection. Presentation to the CTS IGERT Seminar, University of Illinois at Chicago, February 26, 2009
- Auld, J.A. (2008). Prompted Recall Travel Surveying with GPS. Presentation to the Chicago Area Transportation Modeling User Group, Chicago, August 6, 2008
- Auld, J.A. (2008). Dynamic Activity Planning and Scheduling Process Model. Presentation to the ILUTE Project Group, University of Toronto, Toronto, June 27, 2008
- Auld, J.A., C. Williams and A. Mohammadian (2008). Activity-Travel Surveying Using GPS Technology. Presentation to the New Technologies Subcommittee of the Travel Survey Methods Committee at the 87th Annual Meeting of the Transportation Research Board, Washington, D.C., January 13-17, 2008.
- Auld, J.A., J. Lin, K. Kawamura and T.H. Rashidi (2007). Analysis of National County-Level Heavy-Duty Freight Truck Emissions. Proceedings of the 2007 Transport Chicago Conference, Chicago, IL, June 1, 2007.
- Auld, J.A., A. Mohammadian (2007). A Mode-Choice Model for Chicago CBD Work Trips: Applications to the Metra Rock-Island Express Line. Proceedings of the 2007 Transport Chicago Conference, Chicago, IL, June 1, 2007.

PROPOSALS

- Mohammadian, A., J.A. Auld, K. Kawamura (2014). *National Agent-Based Freight Demand Simulation Model*. Proposal submitted to Federal Highway Administration, funding opportunity DTFH61-14-R-00017.
- Ley, H. , J.A. Auld, M. Hope, V. Sokolov, Z.Li, N.Moini, P.S. Sriraj, K. Zhang (2013). *Coordinated Transit Response Planning and Operations Support Tools for Mitigating Impacts of All-Hazard Emergency Events*. Proposal submitted to Federal Transit Administration, funding opportunity FTA-2013-005-TRI. Funded.
- Auld, J.A. and A. Mohammadian (2010). *Long-Distance and Rural Travel Demand Forecasting*. Proposal submitted to National Cooperative Highway Research Program RFP 8-84.
- Auld, J.A., A. Mohammadian, R. Pendyala and K. Goulias (2010). *Implementation of the Agent-Based Dynamic Activity Planning and Travel Scheduling Model (ADAPTS) for Pricing and Policy Analysis in the Chicago Region*. Proposal submitted to Chicago Metropolitan Agency for Planning RFP 047 – Task D.
- A. Mohammadian and Auld, J.A. (2009). Modeling Seniors Activity-Travel Data, Proposal submitted to Illinois Center for Transportation (ICT). Funded.
- A. Mohammadian and Auld, J.A. (2009). Phase II: Population Synthesis in Support of Regional Travel Demand Modeling, Submitted to Chicago Metropolitan Agency for Planning. Funded.

PEER REVIEWER

- Transportation Research, Part A and Part C
- Transportation
- Transportation Letters: International Journal of Transportation Research
- Transportation Research Record and TRB committees ADB10, ADB40 and ABJ40

PROFESSIONAL AFFILIATIONS

- Member, Travel Demand Forecasting Committee (ADB40), Transportation Research Board
- Member, Travel Forecasting Resource Committee (ADB45), Transportation Research Board
- Member, International Association of Travel Behavior Researchers
- Member, International Association of Time Use Research
- Member, World Conference on Transport Research Society
- Friend of Transportation Research Board, Traveler Behavior and Values Committee
- Friend of Transportation Research Board, Survey Methods Committee

SELECTED AWARDS

- Winner of the Ryuichi Kitamura Paper Award, TRB Travel Analysis Methods Section, 2011
- National Science Foundation, IGERT Fellow, 2008-2011
- 1st Place, Student Paper Competition at Transport Chicago Conference, 2008
- 2nd Place, Student Paper Competition at Transport Chicago Conference, 2007
- University Fellow, University of Illinois at Urbana-Champaign, 2002
- James Scholar, University of Illinois at Urbana-Champaign, 1998